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ASSIGNMENT BOOKLET 7A

MAT3037 Pure Mathematics 30
Module 7: Section 1 Assignment

FOR STUDENT USE ONLY	
Date Assignment Submitted: _____	(If label is missing or incorrect) File Number: _____
Time Spent on Assignment: _____	Module Number: _____

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Assigned Teacher: _____

Assignment Grading: _____

Graded by: _____

Date Assignment Received:

Student's Questions and Comments

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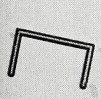
Pure MATHEMATICS 30

Module 7

Probability and Statistics

Assignment Booklet 7A



Learning
Technologies
Branch

Alberta
LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	35	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
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Pure Mathematics 30
Module 7: Probability and Statistics
Assignment Booklet 7A
Section 1 Assignment
Learning Technologies Branch
ISBN 0-7741-1767-2

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ASSIGNMENT BOOKLET 7A
PURE MATHEMATICS 30: MODULE 7
SECTION 1 ASSIGNMENT

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

This Assignment Booklet is worth 35 marks out of the total 100 marks for Module 7.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

Section 1 Assignment: Probability

(35)

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

(4)

1. Children's meals are being prepared for a large gathering. There is an equal number of chicken, hamburger, and fish meals. Each meal comes with a toy: a ball, a parachute toy, or a Frisbee. There are twice as many balls as Frisbees and an equal number of parachutes and Frisbees.

Use a probability tree to show the sample space and determine the probability that a meal consists of chicken or fish and comes with a ball as the toy.

2. For each experiment given, classify the events as either independent or dependent. Explain your answers.

(2)

a. The experiment is to determine how long a candle will burn. The first event is that the candle is over 15 cm, and the second event is the mass of the candle.

(2)

b. The experiment is to check the eye colour and hair colour of a student. The first event is that the student is blonde, and the second event is that the student has blue eyes.

(3)

3. A market survey is conducted to determine whether a sports store should carry expensive training equipment for skiers.

The proportions of people who participate in skiing, skating, and racquet sports are as follows:

skiing:	0.40	skiing and racquet sports:	0.15
skating:	0.55	skating and racquet sports:	0.15
racquet sports:	0.35	all 3 sports:	0.05
skiing and skating:	0.05		

What is the probability that a person chosen at random only participates in skiing?

4. One particular high school encourages students to donate blood. The high school gym is set up for this purpose. The distribution of blood types in North America is as follows:

type O: 44% type A: 42%
type B: 10% type AB: 4%

(3) **a.** What is the probability that the first two people in the line up have the same type of blood? Express your answer to the nearest hundredth of one percent.

(3) **b.** What is the probability that none of the first five people in the line up have type AB blood? Express your answer to the nearest hundredth of one percent.

(3) **5.** To play a game, a die is rolled to see who plays first. Four players are going to play the game. What is the probability that at least two people roll the same number? Express your answer to the nearest tenth of one percent.

6. Investors do not invest all their money in the investment predicted to be the best because it is too risky. An investor holds shares in three independent companies: Company A, Company B, and Company C. An analyst predicts the probability of profit increases for each company as follows:

Company A: 0.70
Company B: 0.50
Company C: 0.65

(2) **a.** If the analyst's predictions are true, what is the probability that all three companies show a profit increase? Express your answer to the nearest hundredth of one percent.

(2) **b.** If the analyst's predictions are true, what is the probability that at least one company shows a profit increase? Express your answer to the nearest hundredth of one percent.

(4)

7. A committee is to be formed to investigate what activities teenagers have available in small communities. The committee is to have 7 members, chosen randomly from interested community members. There are 10 parents, 5 teenagers, and 4 adults without children who have all expressed an interest in serving on the committee.

What is the probability that the adults without children are all on the committee? Express your answer to the nearest tenth of one percent.

(3)

8. In a certain school, it is known that 80% of the students use the Internet for school projects, 60% use e-mail on a regular basis, and 90% use the Internet for school projects or for e-mail on a regular basis. A student from this school is selected at random.

Determine the probability that the student used e-mail, given that the student used the Internet for school projects. Express your answer to the nearest tenth of one percent.

(4)

9. A manufacturer of stoves has to buy oven lights from two different companies because one company alone cannot meet its demand. The manufacturer purchases 60% of the oven lights from Company A and the rest from Company B. Past experience shows that 1% of Company A's oven lights are defective and 2.5% of Company B's oven lights are defective.

Determine the probability that a defective oven light is supplied by Company A. Express your answer to the nearest tenth of one percent.

Pure Mathematics 30
Assignment Booklet 7A
Module 7

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ASSIGNMENT BOOKLET 7B

MAT3037 Pure Mathematics 30
Module 7: Section 2 Assignment and Final Module Assignment

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Time Spent on Assignment: _____	Module Number: _____

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Teacher's Comments

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Pure MATHEMATICS 30

Module 7

Probability and Statistics

Assignment Booklet 7B

Learning Technologies Branch

Alberta LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 2 Assignment	35	
Final Module Assignment	30	
	65	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Pure Mathematics 30
Module 7: Probability and Statistics
Assignment Booklet 7B
Section 2 Assignment and Final Module Assignment
Learning Technologies Branch
ISBN 0-7741-1768-0

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ASSIGNMENT BOOKLET 7B
PURE MATHEMATICS 30: MODULE 7
SECTION 2 ASSIGNMENT AND FINAL MODULE ASSIGNMENT

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

This Assignment Booklet is worth 65 marks out of the total 100 marks for Module 7.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

Section 2 Assignment: Statistics

35

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

1. Statistics Canada reported that approximately 76% of families in Edmonton consist of married couples. There are 22 students in a grade 3 class. The school administration records whether they live with both biological parents who are either married or living common-law. If the child is from a single-parent home, they record the parent with which the child lives.

(2) **a.** What is the probability that exactly half the students have families where the parents are defined as a married couple? Express your answer to the nearest tenth of one percent.

(2)

b. What is the probability that at least one student does not have parents that are defined as a married couple?

(2)

2. The mean and standard deviation of a set of data are two measurements that describe the data. A certain student has written 8 out of 10 unit exams, which are equally weighted. The student misses the ninth exam and receives a score of 0. However, for the last exam, the student studied an incredible amount and scored 100%.

Compare the mean and standard deviation after 8 unit tests and after 10 unit tests.

(2)

3. The following data is the sodium content (in milligrams) of 20 beef hotdogs.

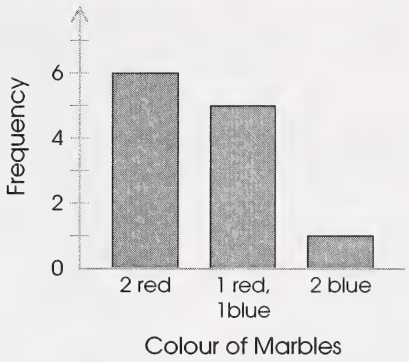
495, 477, 425, 322, 482, 587, 370, 322, 479, 375, 330, 300, 386, 401, 645, 440, 317, 319, 298, 253

Determine the mean and standard deviation of the data using a graphing calculator. Round your answers to 2 decimal places.

(1)

4. A bag of marbles contains two colours: red and blue. Two marbles are drawn from the bag and the colours are recorded. This experiment is performed 12 times.

Determine the approximate probability that 2 red marbles are drawn from the bag.



5. A box of cookies contains a mean mass of 180 g with a standard deviation of 2 g.

(2)

a. One box had a mass that corresponds to a z-score of -1.5. How many grams of cookies did this box contain?

(3)

b. If the mean mass of these boxes is assumed to be normally distributed, what is the probability a box of cookies will contain less than 179 g? Express your answer to the nearest tenth of one percent.

6. In 1998, Statistics Canada reported that 36% of Canadian households use the Internet. George polled 100 households in his neighbourhood to see if they use the Internet more often than the national average.

(3) **a.** Construct a 99% confidence interval for the number of households that use the Internet. Express your answer to the nearest tenth of one percent.

(1) **b.** George found that 60 households use the Internet. Does this fall in the 99% confidence interval?

(1) **c.** George's result of 60 households using the Internet was higher than he had expected. Give one factor that may help explain this result.

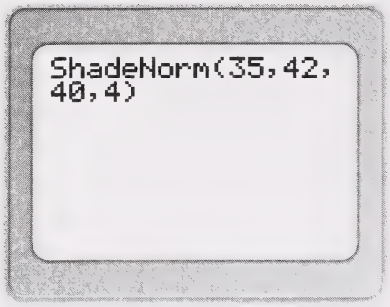
7. In many families, both parents work. As a result, there is increasing need for day care. Data was collected; and in one year in Canada, approximately 32% of children aged 0 to 11 years were in day care for at least 20 h per week.

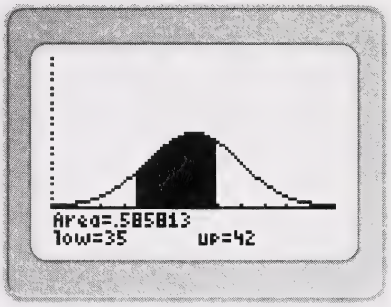
(4) **a.** What is the probability, in a random poll of 60 children from the ages of 0 to 11, that more than 15 children are in day care at least 20 h per week? Express your answer to the nearest tenth of one percent.

(4) **b.** What is the probability, in a random poll of 60 children, that fewer than 20 are in day care at least 20 h per week? Express your answer to the nearest tenth of one percent.

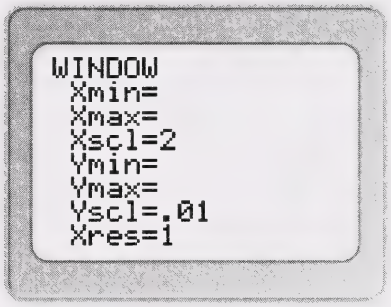
(2) **8.** To graph the normal distributions with your graphing calculator, the domain and range usually has to be adjusted. This is done by changing the window settings.

A function and its corresponding graph of the normal distribution are as follows.





Provide values for the missing window settings that could have been used to graph the normal distribution.



(3) **9.** Head lice can be a problem in classrooms. From past experience, suppose it is predicted that 5% of the students will get lice if there are some reported cases. The health nurse checks 120 randomly chosen students and records the number of students that have head lice. What is the probability that exactly 6, 7, or 8 students in the random sample have head lice? Express your answer to the nearest tenth of one percent.

(3) **10.** Suppose that a certain candidate is running in a city election. A recent poll of 500 randomly chosen voters concludes that 60% of the voters prefer this candidate.

Determine the probability that the candidate will get less than 56% of the votes. Express your answer to the nearest tenth of one percent.

30

Final Module Assignment

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

1. Recently, the number of hours Canadians listen to the radio has increased. Statistics Canada determines information such as this by sending out a questionnaire to a random sample of Canadians. The return rate for this questionnaire is approximately 47%. Approximately 77% of the Canadian population is urban; but returning this questionnaire is not dependent on whether you are an urban dweller or a rural dweller.

(2) **a.** Determine the probability that a Canadian randomly chosen for the sample is an urban dweller and returns the questionnaire. Express your answer to the nearest hundredth of one percent.

(2) **b.** Determine the probability that a Canadian randomly chosen for the sample is a rural dweller and does not return the questionnaire. Express your answer to the nearest hundredth of one percent.

(2) **2.** State whether or not you feel the following pair of events is independent or dependent. Briefly explain your answer.

The experiment is to study the achievements of young athletes. The first event is that the person is accepted on the national ski team, and the second event is that the person is drafted by a team in the National Hockey League.

(3) **3.** Two standard dice are rolled. Determine the probability that the difference between the two numbers on the dice is 2.

(2) **4.** A popular game show begins with the host reading a question to the contestants. One question involves putting four events (A, B, C, and D) in chronological order. What is the probability that the contestant gets the question correct if he or she just guesses? Express your answer to the nearest tenth of one percent.

5. Five students are equally qualified to represent their school at an awards ceremony. Two students will be randomly chosen to go to the ceremony.

(2) **a.** If Tony is one of the five students, what is the probability that he will be chosen?

(3) **b.** Tony's friend, Allecia, who was also eligible to go, has been chosen. What is Tony's probability of being chosen after he learns that Allecia is going?

6. To use telephone banking to pay bills, the customer has to enter the last three digits of each bill. The numbers 0 to 9 inclusive can be used. If the numbers happen to be the same on more than one bill, the customer has to enter the first three digits as well.

(2) **a.** What is the probability that a person has 2 bills to register with the same last three digits?

(3)

b. What is the probability that a person with 10 bills to register has at least 2 bills with the same last three digits? Express your answer to the nearest tenth of one percent.

(3)

7. Sometimes, stores offer incredibly good prices on a product to encourage people to shop at the store. The store usually carries only a few items at the discount price and does not give out rain checks.

A new shipment of 9 VCRs, which will be offered at a very low price, are delivered. Unknown to the manager, 4 of the VCRs are defective.

Determine the probability that at least 1 of the first 3 VCRs sold is defective. Express your answer to the nearest tenth of one percent.

8. Data was collected outside a popular new restaurant to determine the mean waiting time to be seated at a table. Assume the data was normally distributed with a mean of 45 min and standard deviation of 12 min.

(2) **a.** Determine the probability that a randomly selected person has to wait less than 20 min. Express your answer to the nearest tenth of one percent.

(2) **b.** Determine the probability that a randomly selected person has to wait more than 1 h. Express your answer to the nearest tenth of one percent.

(2) **9.** What sample size was needed to obtain an error range of 2% if the following statement was made?

"75% of the workers support the proposed benefit package. These results are considered accurate to within $\pm 2\%$, 18 times out of 20."

Pure Mathematics 30
Assignment Booklet 7B
Module 7

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